United States Government Accountability Office

GAO

Report to Congressional Requesters

May 2014

CHEMICAL SAFETY

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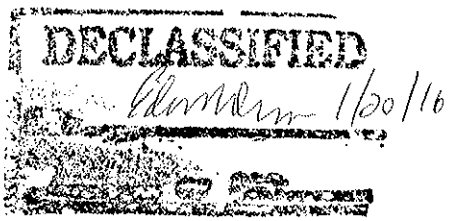

Actions Needed to Improve Federal Oversight of Facilities with Ammonium Nitrate

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GAO-14-274

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May 2014

CHEMICAL SAFETY

Actions Needed to Improve Federal Oversight of Facilities with Ammonium Nitrate

GAO Highlights

Highlights of GAO-14-274, a report to congressional requesters

Why GAO Did This Study

In April 2013, about 30 tons of ammonium nitrate fertilizer detonated during a fire at a facility in West, Texas, killing at least 14 people and damaging nearby schools, homes, and a nursing home. This incident raised concerns about the risks posed by similar facilities across the country. OSHA and EPA play a central role in protecting workers and communities from chemical accidents, and DHS administers a chemical security program. GAO was asked to examine oversight of ammonium nitrate facilities in the United States and other countries. This report addresses (1) how many facilities have ammonium nitrate in the United States, (2) how OSHA and EPA regulate and oversee facilities that have ammonium nitrate, and (3) what approaches selected other countries have adopted for regulating and overseeing facilities with ammonium nitrate. GAO analyzed available federal data and data from selected states with high use of ammonium nitrate; reviewed federal laws and regulations; and interviewed government officials, chemical safety experts, and industry representatives in the United States and selected countries.

What GAO Recommends

GAO is recommending that agencies improve data sharing, that OSHA and EPA consider revising their related regulations to cover ammonium nitrate, and OSHA conduct outreach to the fertilizer industry and target high risk facilities for inspection.

View GAO-14-274. For more information, contact Revae Moran at (202) 512-7215 or moranr@gao.gov.

What GAO Found

Federal data provide insight into the number of facilities in the United States with ammonium nitrate but do not provide a complete picture because of reporting exemptions and other data limitations. The Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) do not require facilities to report their ammonium nitrate holdings. The Department of Homeland Security (DHS) requires facilities with certain quantities of ammonium nitrate to report their holdings for security purposes. While the total number of facilities in the United States with ammonium nitrate is unknown, as of August 2013, at least 1,300 facilities in 47 states reported to DHS that they had reportable quantities of ammonium nitrate. Federal law also requires certain facilities to report their ammonium nitrate holdings to state and local authorities for emergency planning purposes, but these data are not easily accessible to federal agencies because states are not required to report these data to them, and each state determines how to share its data. As part of an Executive Order on Improving Chemical Facility Safety and Security issued in August 2013, federal agencies are exploring options for improving data sharing, but this work has not been completed.

OSHA and EPA provide limited oversight of facilities that have ammonium nitrate. OSHA's regulations include provisions for the storage of ammonium nitrate, but the agency has done little outreach to increase awareness of these regulations within the fertilizer industry, a primary user. In addition, the regulations have not been significantly revised since 1971 and allow storage of ammonium nitrate in wooden buildings, which could increase the risk of fire and explosion. Other OSHA and EPA chemical safety regulations—which require facilities to complete hazard assessments, use procedures to prevent and respond to accidents, and conduct routine compliance audits—do not apply to ammonium nitrate. Furthermore, although OSHA targets worksites in certain industries for inspection, its inspection programs do not target facilities with ammonium nitrate because, according to OSHA officials, information on these facilities is not available to them to use in targeting the facilities. International chemical safety guidance suggests authorities should provide facilities information on how regulatory requirements can be met and periodically inspect them.

GAO reviewed approaches for overseeing facilities with ammonium nitrate in Canada, France, Germany, and the United Kingdom, selected in part based on recommendations from chemical safety experts. According to foreign officials and government documents, these countries require facilities with specified quantities of ammonium nitrate to assess its risk and develop plans or policies to prevent chemical accidents. For example, Canadian officials said facilities with 22 tons or more of ammonium nitrate are required to complete a risk assessment and an emergency plan. Some countries' storage requirements also restrict the use of wood to store ammonium nitrate. For example, officials told GAO France restricted the use of wood for storing ammonium nitrate fertilizer after several incidents involving ammonium nitrate fertilizer, and German officials told GAO certain ammonium nitrate and ammonium nitrate-based preparations must be separated from combustible materials by brick or concrete walls.

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Abbreviations

CFATS	Chemical Facility Anti-Terrorism Standards
DHS	Department of Homeland Security
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act of 1986
EU	European Union
OECD	Organisation for Economic Co-operation and Development
OSHA	Occupational Safety and Health Administration
OSH Act	Occupational Safety and Health Act of 1970
PSM	Process Safety Management
RMP	Risk Management Program

May 2014

The Honorable George Miller
Ranking Member
Committee on Education and the Workforce
House of Representatives

The Honorable Joe Courtney
Ranking Member
Subcommittee on Workforce Protections
Committee on Education and the Workforce
House of Representatives

The Honorable Robert P. Casey, Jr.
Chairman
Subcommittee on Employment and Workplace Safety
Committee on Health, Education, Labor, and Pensions
United States Senate

In April 2013, about 30 tons of ammonium nitrate fertilizer detonated during a fire at a fertilizer storage and distribution facility in West, Texas, killing at least 14 people and injuring more than 200 others. The explosion severely damaged or destroyed nearly 200 homes, 3 nearby schools, a nursing home, and an apartment complex.[1] While ammonium nitrate is widely used in agriculture, mining, and other industries, the Texas tragedy underscores the need for great care in its storage and handling. Today, significant quantities of ammonium nitrate fertilizer are stored in facilities across the United States: in 2012, U.S. companies exported almost 370,000 tons of ammonium nitrate and imported 938,000 tons.[2] The extent and location of such facilities, however, is not clear.

[1] Rafael Moure-Eraso, Chairperson, Chemical Safety and Hazard Investigation Board (Chemical Safety Board), testimony before the Senate Committee on Environment and Public Works, 113th Congress 1st Sess., June 27, 2013. The Chemical Safety Board is an independent federal safety board charged with investigating chemical accidents.

[2] Department of Agriculture's Economic Research Service. U.S. Imports (1995-2012) and Exports (1990-2012) of Selected Fertilizers, by Country. These data are from January 2012 to December 2012. These data are based on U.S. Merchandise Imports and Exports, released monthly by the U.S. Department of Commerce, Foreign Trade Division.

In response to the explosion in West, Texas, President Obama issued an Executive Order on August 1, 2013 designed to improve the safety and security of chemical facilities and reduce the risks that hazardous chemicals pose to workers and communities.[3] The order, which includes a focus on ammonium nitrate, established a federal working group to improve coordination by federal agencies with state and local partners; enhance federal agency coordination and information sharing; modernize policies, regulations, and standards; and work with stakeholders to identify best practices.

Several federal agencies are involved in regulating facilities with hazardous chemicals, but the Department of Labor's Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) play central roles in protecting workers and communities from chemical accidents at facilities.[4] In addition, the Department of Homeland Security (DHS) administers a chemical security program, the Chemical Facility Anti-Terrorism Standards (CFATS) program, which requires certain chemical facilities to report information to DHS, and in some instances, take additional steps to secure their facilities. You asked us to examine federal oversight of facilities with ammonium nitrate in the United States and approaches used by other countries. For this review we addressed the following questions: (1) How many facilities in the United States have ammonium nitrate? (2) How do OSHA and EPA regulate and oversee facilities that have ammonium nitrate? (3) What approaches have selected other countries adopted for regulating and overseeing facilities with ammonium nitrate?

To answer question 1, we analyzed data from DHS's CFATS program and other sources on the number and types of facilities that reported having ammonium nitrate as of August 2013 and documented the limitations of the data .[5] To assess the reliability of the CFATS data, we reviewed agency documentation, interviewed DHS officials, and performed electronic testing of required data elements. We also requested state data on facilities that reported having ammonium nitrate from four states with high ammonium nitrate fertilizer consumption–Alabama, Missouri, Tennessee, and Texas– and received data from Texas and Alabama. We also compared data collected by DHS to other data sources, including chemical inventory data from

[3] Improving Chemical Facility Safety and Security, Exec. Order No. 13,650, 78 Fed. Reg. 48,029 (Aug. 7, 2013).

[4] For the purposes of this report, we use the term facility to mean any fixed site where hazardous chemicals are present, which can include chemical manufacturers, distributors, and farm supply retailers. The term facility may be defined differently for regulatory purposes.

[5] DHS requires facilities to report if they possess certain chemicals at or above its screening threshold quantities. This may include facilities that manufacture, process, use, store, or distribute these chemicals.

Alabama and Texas, which were identified as leading users of ammonium nitrate fertilizer, and trade data collected by DHS's Customs and Border Protection agency on U.S. imports and exports of ammonium nitrate.[6] Our primary purpose in comparing CFATS data with data from other sources was to determine whether the CFATS data represent a complete count of facilities with ammonium nitrate rather than to determine whether each facility required to report to CFATS had done so. We determined that the CFATS data were sufficiently reliable for purposes of providing the number and type of facilities that reported having ammonium nitrate at levels that met thresholds for reporting under CFATS. However, as we discuss later in this report, certain limitations of the data did not allow us to determine whether all facilities that should have reported to DHS actually did so.

For question 2, we reviewed relevant federal laws and regulations, focusing on OSHA's and EPA's regulations, including the types of facilities covered by the regulations. We also interviewed federal agency officials regarding their oversight practices.

To determine the approaches selected other countries have adopted for regulating and overseeing facilities with ammonium nitrate, we reviewed approaches used by selected member countries of the European Union (EU) and the Organisation for Economic Co-operation and Development (OECD): Canada, France, Germany, and the United Kingdom. To select these four countries, we considered the extent to which the countries use ammonium nitrate fertilizer, the results of our literature search, and recommendations from our interviews with chemical safety experts. There are key differences between the United States and these other countries, including the size of the country, the size of the agricultural industry, and the amount of ammonium nitrate used. We interviewed government officials from the EU and the countries selected and reviewed documents provided by the officials. We did not conduct an independent legal analysis to verify the information provided about the laws, regulations, or policies of the foreign countries selected for this study. We also interviewed U.S. and international fertilizer industry associations, chemical safety experts, and federal officials to obtain their views on U.S. chemical safety regulations and oversight, and the practices of the selected countries.

We conducted this performance audit from June 2013 to May 2014 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings

[6] DHS's Customs and Border Protection agency collects real time data on shipments of products to and from the United States as part of its efforts to facilitate international trade and protect national security.

and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Use and Hazards of Ammonium Nitrate

Ammonium nitrate products are manufactured and sold in various forms, depending upon their use. For example, ammonium nitrate fertilizer may be produced and sold in liquid form or as solid granules.[7] According to The Fertilizer Institute, solid ammonium nitrate fertilizer is used heavily by farmers in Alabama, Missouri, Tennessee, and Texas primarily on pastureland, hay, fruit, and vegetable crops.[8] In addition to its agricultural benefits, ammonium nitrate can be mixed with fuel oil or other additives and used by the mining and construction industries as an explosive for blasting.[9]

While ammonium nitrate can increase agricultural productivity, use of this chemical also poses a safety and health risk because it can intensify a fire and, under certain circumstances, explode. Ammonium nitrate by itself does not burn, but if it comes in contact with combustible materials, it increases the risk of fire. In addition, ammonium nitrate that is stored in a confined space and reaches high temperatures can explode.[10] An explosion is more likely to occur if ammonium nitrate is contaminated by certain materials, such as fuel oil, or if it is stored in large stacks.

Because of ammonium nitrate's potential to explode, facilities storing ammonium nitrate may pose a security threat because it can be used to make weapons. Ammonium nitrate fertilizer

[7] According to the Chemical Safety Board, a granular solid form of ammonium nitrate was stored at the West, Texas facility. Rafael Moure-Eraso, Chairperson, Chemical Safety Board, testimony before the Senate Committee on Environment and Public Works, 113th Congress 1st Sess., June 27, 2013. Fertilizer sales data published by the Department of Agriculture suggest that solid ammonium nitrate fertilizer represents about 3 percent of all types of fertilizer sold in the United States and that ammonium nitrate fertilizer sales have declined in recent years.

[8] The Fertilizer Institute is a national organization representing producers, importers, retailers, and others involved in the fertilizer industry.

[9] Products containing ammonium nitrate can vary in their composition and chemical properties, depending on the purpose for which they will be used, such as a fertilizer or as an explosive, and different types of ammonium nitrate may be subject to different regulatory requirements, as discussed later in this report.

[10] Information about the hazards of ammonium nitrate can be found in the International Chemical Safety Card for Ammonium Nitrate published by the National Institute for Occupational Safety and Health, which is part of the Department of Health and Human Services' Centers for Disease Control and Prevention.

has been used by terrorists to make explosive devices both domestically and internationally.[11] For example, in April 1995, ammonium nitrate fertilizer was used by a domestic terrorist to blow up a federal building in Oklahoma City, Oklahoma. The explosion killed 168 people and several hundred more were injured.

Ammonium nitrate has been involved in several major chemical accidents over the past century, including disastrous explosions in the United States and Europe.[12] In addition to killing at least 14 people and injuring more than 200 others, the explosion in West, Texas severely damaged or destroyed nearly 200 homes; an apartment complex; and three schools that were, at the time, unoccupied (see fig. 1). Prior to that incident, an explosion in 1994 involving ammonium nitrate at a factory in Port Neal, Iowa killed four workers and injured 18 people. In 1947, explosions aboard two ships holding thousands of tons of ammonium nitrate fertilizer killed more than 500 people, injured approximately 3,500, and devastated large areas of industrial and residential buildings in Texas City, Texas. In Europe, accidents involving ammonium nitrate have occurred in Germany, Belgium, and France. A 1921 accident in Germany and one in Belgium in 1942 caused hundreds of deaths after explosives were used to break up piles of hundreds of tons of ammonium nitrate, resulting in large scale detonations. In France, a ship carrying more than 3,000 tons of ammonium nitrate exploded in 1947, a few months after the Texas City disaster, after pressurized steam was injected into the storage area in an attempt to put out a fire. In 2001, an explosion at a fertilizer plant in Toulouse, France involving between 22 and132 tons of ammonium nitrate resulted in 30 deaths, thousands of injuries requiring hospitalization, and widespread property damage. Past accidents also indicate that smaller quantities of ammonium nitrate can cause substantial damage. For example, in 2003, an explosion of less than 6 tons of ammonium nitrate in a barn in rural France caused significant property damage and injured 23 people.

[11] See GAO, *Combating Terrorism: State Should Enhance Its Performance Measures for Assessing Efforts in Pakistan to Counter Improvised Explosive Devices,* GAO-12-614 (Washington, D.C.: May 15, 2012).

[12] Rafael Moure-Eraso, Chairperson, Chemical Safety Board, testimony before the Senate Committee on Environment and Public Works, 113th Congress 1st Sess., June 27, 2013.

Figure 1: Photographs of Damage from the Explosion in West, Texas in April 2013

Source: Chemical Safety Board.

Source: Chemical Safety Board.

Federal Agencies' Responsibilities for Promoting Chemical Safety and Security

OSHA and EPA play key roles in protecting the public from the effects of chemical accidents, with EPA focusing on the environment and public health and OSHA focusing on worker safety and health. Under the Occupational Safety and Health Act of 1970 (OSH Act), OSHA is the federal agency responsible for setting and enforcing regulations to protect workers from hazards in the workplace, including exposure to hazardous chemicals.[13] In addition, the Clean Air Act Amendments of 1990 designated roles for both OSHA and EPA with respect to preventing chemical accidents and preparing for the consequences of chemical accidents.[14] In response to the requirements in this act, OSHA issued Process Safety Management (PSM) regulations in 1992 to protect workers engaged in processes that involve certain highly hazardous chemicals, and EPA issued Risk Management Program (RMP) regulations in 1996 to require facilities handling particular chemicals to plan how to prevent and address chemical accidents.[15] The PSM and RMP regulations each apply to processes involving a specified list of chemicals above threshold quantities, and require covered facilities to take certain steps to prevent and prepare for chemical accidents. However, neither OSHA's PSM regulations nor EPA's RMP regulations cover ammonium nitrate.

The Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) establishes authorities for emergency planning and preparedness and emergency release notification reporting, among other things.[16] Under section 312 of EPCRA and EPA regulations, facilities with certain hazardous chemicals in amounts at or above threshold levels, including ammonium

[13] Pub. L. No. 91-596, 84 Stat. 1590 (codified as amended at 29 U.S.C. §§ 553, 651-78). OSHA's regulations on hazardous materials may be found in subpart H of 29 C.F.R. pt. 1910. OSHA's regulations apply to private sector workplaces and some federal government workplaces. In this report, we focused on regulations that apply to private sector workplaces.

[14] Pub. L. No. 101-549, §§ 301, 304, 104 Stat. 2399, 2563-74, 2576-77.

[15] See 29 C.F.R. § 1910.119 and app. A (OSHA's regulation on process safety management of highly hazardous chemicals) and 40 C.F.R. pt. 68 (EPA's risk management program regulations).

[16] Pub. L. No. 99-499, tit. III, 100 Stat. 1613, 1728-58 (codified at 42 U.S.C. §§ 11001-50).

nitrate, are required to annually submit chemical inventory forms to state and local authorities to help emergency response officials prepare for and respond to chemical incidents.[17]

For purposes of enhancing security, the Department of Homeland Security (DHS) Chemical Facility Anti-Terrorism Standards (CFATS) program requires facilities possessing certain chemicals at or above threshold quantities–including ammonium nitrate–to submit reports to DHS with information about the facility and the regulated chemicals present onsite. [18] Among other things, DHS collects information on the quantities of certain hazardous chemicals held at facilities, the location of the facilities, and their industry codes.[19] DHS set different threshold quantities based on the type of ammonium nitrate and the type of security risk presented (see table 1).

Table 1: DHS Thresholds for Reporting Ammonium Nitrate

Type of Ammonium Nitrate	Threshold
Ammonium nitrate with more than 0.2 percent combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance[a]	400 pounds for a theft risk (if in transportation packaging) [c] and 5,000 pounds for a release risk.
Solid ammonium nitrate with a nitrogen concentration of 23 percent or greater, and, if in a mixture, a minimum ammonium nitrate concentration of 33 percent or greater [b]	2,000 pounds for a theft risk (if in transportation packaging)

Source: DHS CFATS regulations.

[a] This type of ammonium nitrate is often referred to as "explosives grade", according to DHS.

[17] 42 U.S.C. § 11022. EPA's regulations implementing sections 311 and 312 of EPCRA, pertaining to hazardous chemical reporting, are found at 40 C.F.R. pt. 370. As discussed later in this report, according to an August 2013 chemical advisory issued by the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), EPA, and OSHA, ammonium nitrate is considered a hazardous chemical subject to the EPCRA reporting provisions. However, EPCRA exempts any substance "to the extent it is used in routine agricultural operations or is a fertilizer held for sale by a retailer to the ultimate customer." 42 U.S.C. § 11021(e)(5). According to the advisory, this exemption applies only to ammonium nitrate retailers, not to manufacturers or wholesalers.

[18] DHS established the CFATS program in response to a requirement in its annual appropriations. See Department of Homeland Security Appropriations Act, 2007, Pub. L. No. 109-295, § 550, 120 Stat. 1355, 1388-89 (2006). CFATS initially included 322 chemicals of interest and the screening threshold quantities for each chemical. See 6 C.F.R. pt. 27 and app. A. Additional requirements may apply to a facility, based on the information provided or other factors. For more information on the CFATS program see: GAO, *Critical Infrastructure Protection: DHS Needs to Improve Its Risk Assessments and Outreach for Chemical Facilities*, GAO-13-801T (Washington, D.C.: Aug 1, 2013) and GAO, *Critical Infrastructure Protection: DHS Efforts to Assess Chemical Security Risk and Gather Feedback on Facility Outreach Can Be Strengthened*, GAO-13-353 (Washington, D.C.: April 5, 2013), and GAO, *Critical Infrastructure Protection: Observations on DHS Efforts to Identify, Prioritize, Assess, and Inspect Chemical Facilities*, GAO-14-365T (Washington, D.C.: February 27, 2014).

[19] North American Industry Classification System (NAICS) industry codes are used to classify the industry that best describes the facilities that report to DHS.

[b] This type of ammonium nitrate is often referred to as "fertilizer grade", according to DHS.

[c] DHS's CFATS regulations provide that in calculating whether a facility possesses a threshold amount of a chemical that poses a theft or diversion risk, the facility shall only include those chemicals that are in transportation packaging as defined by Department of Transportation regulations. 6 C.F.R. § 27.203(c).

Not all facilities with ammonium nitrate, however, are required to file CFATS reports with DHS. First, facilities are only required to report if they are holding more than threshold quantities of specific types of ammonium nitrate. Also, DHS does not require certain agricultural producers to report their chemical holdings to DHS.[20] In addition, DHS's reporting threshold for ammonium nitrate fertilizer only applies to quantities held in transportable containers such as cylinders, bulk bags, bottles (inside or outside of boxes), cargo tanks, and tank cars.[21] Finally, there are several statutory exemptions to CFATS requirements. Specifically, CFATS does not apply to public water systems or treatment works, any facility that is owned or operated by the Department of Defense or the Department of Energy, facilities regulated by the Nuclear Regulatory Commission, or facilities covered by the Maritime Transportation Security Act of 2002 administered by the Coast Guard.[22]

Other federal agencies regulate different aspects of the use of hazardous chemicals. For example, the Department of Transportation regulates the transport of hazardous materials, the Coast Guard inspects containers of hazardous materials at ports and waterways, and the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) in the Department of Justice regulates the manufacture, distribution, and storage of explosive materials, including blasting

[20] Pursuant to its authority under 6 C.F.R. § 27.210(c), DHS has extended the deadline for submitting CFATS reports until further notice for certain agricultural production facilities. See Notice to Agricultural Facilities About Requirement To Complete DHS' Chemical Security Assessment Tool, 73 Fed. Reg. 1640 (Jan. 9, 2008).

[21] DHS's CFATS regulations provide that in calculating whether a facility possesses a threshold amount of a chemical that poses a theft or diversion risk, the facility shall only include those chemicals that are in transportation packaging as defined by Department of Transportation regulations. 6 C.F.R. § 27.203(c). DHS considers ammonium nitrate fertilizer a chemical of interest because it can be stolen or otherwise diverted to make explosives. According to DHS officials, ammonium nitrate fertilizer stored in bulk does not have to be reported because it is more difficult to transport. For explosives grade ammonium nitrate, which presents both a theft risk and a release risk, the reporting thresholds are 400 pounds or more (if in transportation packaging) and 5,000 pounds or more (if not).

[22] Department of Homeland Security Appropriations Act, 2007, Pub. L. No. 109-295, § 550(a), 120 Stat. 1355, 1388-89 (2006), 6 C.F.R. § 27.110(b).

agents and other explosive materials containing ammonium nitrate.[23] Fertilizer grade ammonium nitrate, however, is not classified as an explosive under ATF regulations.

State and Local Government Responsibilities for Promoting Chemical Safety

State and local government agencies are also involved in regulating hazardous chemical facilities under federal laws and their own state or local laws. Federal laws may authorize or assign state and local governments certain roles and responsibilities for overseeing chemical facilities. For example, as permitted by the OSH Act, OSHA has approved state plans that authorize about half the states to operate their own occupational safety and health programs.[24] As a result, private sector workplaces in 21 states and Puerto Rico are regulated and inspected by state occupational safety and health agencies rather than OSHA.[25] Similarly, EPA has delegated its authority to implement and enforce the Risk Management Program to 9 states and 5 counties.[26] As previously mentioned, both state and local governments play a role in implementing EPCRA, which requires covered facilities to report basic information about their hazardous chemical inventories to certain state and local authorities, including estimates of the amounts of chemicals present at facilities.

In addition, state and local governments may establish and enforce their own laws, regulations, or ordinances to protect the public from chemical accidents. For example, state and local

[23]ATF collects data on individuals that apply for federal explosives licenses and permits, which may include individuals working with ammonium nitrate.

[24] The OSH Act allows states to take responsibility for operating their own occupational safety and health programs under state plans approved by OSHA. To receive approval, state plans must meet certain criteria specified in the OSH Act, including the development and enforcement of state standards that are at least as effective as the federal standards. See generally 29 U.S.C. § 667, 29 C.F.R. pts. 1902, 1952, and 1956. Under the OSH Act, "state" is defined to include the District of Columbia, Puerto Rico, the Virgin Islands, American Samoa, Guam, and the Trust Territory of the Pacific Islands. See 29 U.S.C. § 652(7).

[25] OSHA does not enforce standards for state and local public-sector workplaces because the OSH Act does not apply to state and local government employers. 29 U.S.C. § 652(5). States that choose to operate their own state-run programs are required to cover state and local government workers. 29 U.S.C. § 667(c)(6). Five states have state plans that only include state and local government workers; OSHA provides enforcement for the private sector in those states.

[26] Under the Clean Air Act, EPA is authorized to delegate its implementation and enforcement authority of section 112 (including the RMP program) to states, provided the state standards are no less stringent than EPA's. 42 U.S.C. § 7412(l), 40 C.F.R. §§ 63.90-63.99. According to EPA officials, the delegated states include: Delaware, Florida, Georgia, Mississippi, New Jersey, North Carolina, North Dakota, Ohio, and South Carolina.

governments may adopt and enforce fire codes or zoning laws that specify how far chemical facilities must be located from residential areas.

Executive Order on Improving Chemical Facility Safety and Security

The Executive Order issued on August 1, 2013 established a Chemical Facility Safety and Security Working Group co-chaired by the Secretary of Homeland Security, the Administrator of EPA, and the Secretary of Labor. The Executive Order includes directives for the working group to: improve operational coordination with state and local partners; enhance federal agency coordination and information sharing; modernize policies, regulations, and standards; and work with stakeholders to identify best practices. The order includes tasks focused specifically on ammonium nitrate. [27] Specifically, it directs the Secretaries of Homeland Security, Labor, and Agriculture to develop a list of potential regulatory and legislative proposals to improve the safe and secure storage, handling, and sale of ammonium nitrate. In addition, the Department of Labor and EPA are directed to review the chemical hazards covered by the RMP and PSM regulations and determine whether they should be expanded to address additional hazards.

OECD's Guidance on Chemical Safety

The Organisation for Economic Co-operation and Development (OECD), an intergovernmental organization with 34 member countries, issued guidance in 2003 on the prevention of, preparedness for, and response to chemical accidents.[28] This publication was developed with other international organizations active in the area of chemical accident safety, such as the World Health Organization. The guidance—OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response— includes detailed guidance for industry, public authorities, and the public on how they can help prevent chemical accidents and better respond when accidents occur.

[27] In addition to the specific provisions focused on ammonium nitrate, the Executive Order also addresses other hazardous chemicals more generally.

[28] The 34 OECD member countries are Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel , Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, and the United States. See *OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response: Guidance for Industry (including Management and Labour), Public Authorities, Communities, and other Stakeholders*, OECD 2003.

Over 1,300 Facilities in 47 States Reported Having Ammonium Nitrate, but Data Limitations Prevent Obtaining a Complete Count of Facilities

While the total number of facilities with ammonium nitrate is unknown, over 1,300 facilities reported having ammonium nitrate to DHS. The total number of facilities is difficult to determine because of the different reporting criteria used by different government agencies, reporting exemptions, and other data limitations. In addition, DHS's data do not include all facilities that work with ammonium nitrate, in part because some facilities, such as farms, currently do not have to report to DHS and, according to DHS officials, other facilities that are required to report may fail to do so.

DHS Data List Over 1,300 Facilities in 47 States with Ammonium Nitrate

As of August 2013, 1,345 facilities located in 47 states reported to DHS under CFATS that they had ammonium nitrate. The facilities that reported to DHS as having reportable quantities of ammonium nitrate were most often engaged in supplying and supporting the agriculture and mining industries. Also, many of these facilities were concentrated in the South. About half of these facilities were located in six states: Alabama, Georgia, Kentucky, Missouri, Tennessee, and Texas. Table 2 shows the number of facilities that reported to DHS that they had ammonium nitrate and the number of states in which they were located.

Table 2: Number of Facilities that Reported Having Ammonium Nitrate to the Department of Homeland Security (DHS) and the Number of States in Which They Were Located, August 2013

Type of Ammonium Nitrate	Number of Facilities	Number of States
Ammonium nitrate with more than 0.2 percent combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance[a]	230	42
Solid ammonium nitrate with a nitrogen concentration of 23 percent or greater, and, if in a mixture, a minimum ammonium nitrate concentration of 33 percent or greater [b]	941	45
Reported having both types of ammonium nitrate	174	40
Total number of facilities that reported having ammonium nitrate	**1,345**	**47**

Source: GAO analysis of DHS data

[a] This type of ammonium nitrate is often referred to as "explosives grade," according to DHS. The threshold quantity for reporting this type of ammonium nitrate is 400 pounds for a theft risk (if in transportable packaging) and 5,000 pounds for a release risk.

[b] This type of ammonium nitrate is often referred to as "fertilizer grade," according to DHS. The threshold quantity for reporting this type of ammonium nitrate for a theft risk (if in transportation packaging) is 2,000 pounds.

State Data and Federal Trade Data Suggest That the Total Number of Facilities with Ammonium Nitrate is Greater Than Those That Report to DHS

Our review of state EPRCA data from Texas and Alabama, which have different reporting criteria than CFATS,[29] indicated that there are more facilities with ammonium nitrate than those that report to DHS.[30] These two states provided additional data to us on facilities with ammonium nitrate. We compared the data they provided to the data on facilities that reported to DHS under CFATS. In these two states, we found that the data from each of the sources provided to us differed and that no single count of such facilities, whether from the state or DHS, represented a comprehensive picture of facilities with ammonium nitrate.

For Texas, we reviewed three sources of data on facilities that have ammonium nitrate: (1) EPCRA data from the Texas Department of State Health Services; (2) a list of facilities that registered with the Texas State Chemist's office that they planned to produce, store, or sell ammonium nitrate; and (3) DHS's CFATS data.[31] We compared data from all three of these

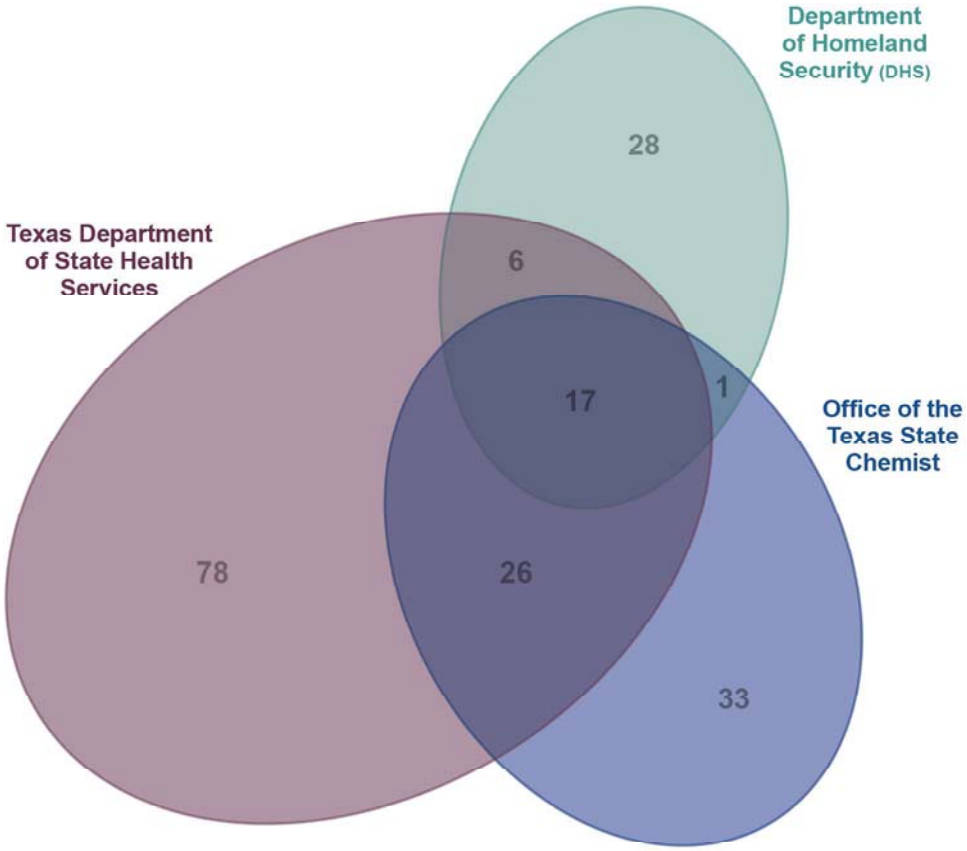
[29] Under section 312 of EPCRA and EPA's regulations, facilities with 10,000 pounds or more of ammonium nitrate generally must submit an annual chemical inventory report to their designated state and local authorities. 42 U.S.C. § 11022, 40 C.F.R. § 370.10(a)(2)(i).The designated authorities are the state emergency response commission, the local emergency planning committee, and the local fire department. A facility is required to submit these reports if (1) it is required to prepare a material safety data sheet (now called a safety data sheet) for a hazardous chemical as defined by OSHA's Hazard Communication regulations, 29 C.F.R. § 1910.1200, and (2) the amount of the hazardous chemical meets or exceeds the threshold set by EPA's regulations. For most hazardous chemicals that are not on EPA's list of Extremely Hazardous Substances, the reporting threshold is 10,000 pounds or more. According to the chemical advisory issued by ATF, EPA, and OSHA in August 2013, ammonium nitrate is not considered an Extremely Hazardous Substance, but it is considered a hazardous chemical under OSHA's Hazard Communication regulations and is therefore subject to the EPCRA provisions. However, EPCRA exempts any substance "to the extent it is used in routine agricultural operations or is a fertilizer held for sale by a retailer to the ultimate customer." 42 U.S.C. § 11021(e)(5). According to the advisory, this exemption applies only to ammonium nitrate retailers, not to manufacturers or wholesalers.

[30] We compared the facility names and zip codes used by facilities reporting to the state to the facilities that reported to DHS. Because of differences in reporting requirements, the differences in the number of facilities reporting to DHS and the number reporting to the states does not necessarily indicate noncompliance with the requirements.

[31] In Texas, facility owners must register with the Texas State Chemist's Office to produce, store, or sell ammonium nitrate, and there is no minimum threshold amount of ammonium nitrate that applies to this state requirement. See Tex. Agric. Code Ann. §§ 63.151-63.157. This requirement applies to ammonium nitrate that contains more than 33 percent nitrogen, as well as solid fertilizer containing ammonium nitrate, if the fertilizer's nitrogen content from the ammonium nitrate is at least 28 percent of the fertilizer by weight. Facilities are required to keep records of the sale of ammonium nitrate and provide the records upon request to the State Chemist and other state agencies.

sources and found 189 facilities that reported having ammonium nitrate (see fig. 2). Of these 189 facilities, 52 filed CFATS reports with DHS. We, however, were unable to determine whether all of these facilities were required to file CFATS reports. DHS officials told us the agency has begun an effort to obtain lists of chemical facilities the states have compiled and compare them with its CFATS data to identify facilities that should have filed CFATS reports but did not. This effort, however, has not been completed. As shown in figure 2, 17 of the 189 facilities in Texas were listed in all three data sources.

Figure 2: Number of Facilities in Texas that Reported to State Agencies and DHS That They Had Ammonium Nitrate [a]



Source: GAO analysis of U.S. Department of Homeland Security and state agency data.

Note: [a] This figure includes data reported to the Texas Department of State Health Services under EPCRA section 312 as of December 2012 , data collected by the Texas State Chemist's office under state law as of November 2013, and data reported to DHS under the CFATS program as of August 2013. Each of these programs has different reporting criteria, and therefore facilities required to report under one program may not be required to report under another program.

For Alabama, we reviewed data from two sources on facilities that reported having ammonium nitrate: (1) EPCRA data from Alabama's Department of Environmental Management and (2) DHS's CFATS data.[32] From these two sources, we found 91 facilities that reported having ammonium nitrate— 57 that filed EPCRA reports with the state Department of Environmental Management and 71 that filed CFATS reports with DHS. Thirty-seven of the facilities filed reports with both the state and DHS. (See fig. 3.)

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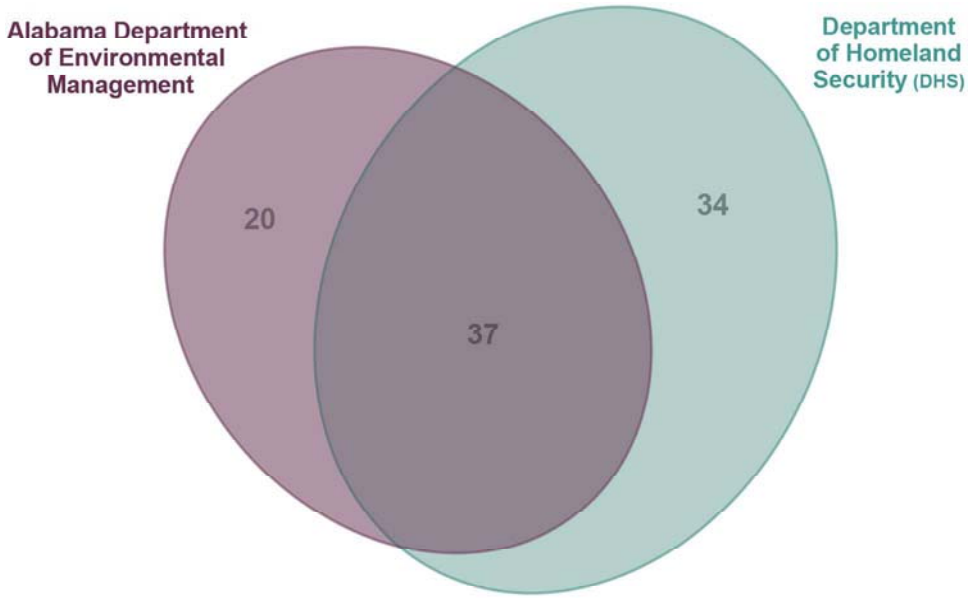
Figure 3: Number of Facilities in Alabama that Reported to the State and DHS That They Had Ammonium Nitrate[a]



Source: GAO analysis of U.S. Department of Homeland Security and state agency data.

Note: [a] This figure includes data reported to the Alabama Department of Environmental Management under EPCRA section 312 as of December 2012 and data reported to DHS under the CFATS program as of August 2013. Each of these programs has different reporting criteria, and therefore facilities required to report under one program may not be required to report under another program.

Our analysis of federal trade data collected by DHS's Customs and Border Protection agency also suggests that a greater number of facilities have ammonium nitrate than those that reported to DHS under the CFATS program.[33] Using the data from the Customs and Border

[32] We did not find any other state agencies in Alabama that required reporting of ammonium nitrate holdings similar to the requirements of the State Chemist's Office in Texas.

[33] We compared the facility names and the city names used by companies that import and export ammonium nitrate to the facilities that reported to DHS.

Protection agency, we identified 205 facilities that imported ammonium nitrate products and 81 facilities that exported ammonium nitrate products in fiscal year 2013.[34] The majority of these facilities reported importing or exporting mixtures of ammonium nitrate and calcium carbonate or mixtures of urea and ammonium nitrate. Eight of these facilities filed CFATS reports with DHS. Moreover, we found about 100 facilities that imported or exported a form of ammonium nitrate that may be subject to DHS's CFATS requirements for reporting quantities over 2,000 pounds but did not file a report.[35] These facilities, however, may not be required to file CFATS reports. For example, they may meet one of the statutory exemptions, or the composition of their ammonium nitrate (or their ammonium nitrate mixture) may not trigger the reporting requirements. We could not determine whether they were exempt from DHS's reporting requirements or whether they failed to file reports as required because data were not readily available to determine whether they met all of DHS's reporting requirements for the CFATS program. In addition, according to DHS officials, other data limitations could explain some of the differences between the CFATS data and the federal trade data. For example, facilities may submit reports to the different agencies using different names and addresses. According to DHS, different people in the facility may prepare the different reports; the facility may define the perimeters of each site differently; or the corporate structure or nomenclature may have changed from the time one report was submitted to the next reporting period.

Differences in Reporting Criteria, Including Exemptions, and Facilities' Failure to File Required Reports Also Prevent Full Identification of Facilities with Ammonium Nitrate

The total number of facilities with ammonium nitrate is also difficult to determine because of the variation in reporting criteria, including exemptions for some facilities from reporting to either their state or to DHS. For example, farmers could be exempt from reporting under both EPCRA and CFATS because EPCRA's reporting requirements do not apply to substances used in routine agricultural operations and, as previously mentioned, DHS does not currently require

[34] We counted any facility that imported or exported products with "ammonium nitrate" listed as part of the product description.

[35] We identified imports or exports of "ammonium nitrate," but the federal trade data did not provide the actual chemical composition of the fertilizer; therefore, we could not determine whether these facilities were subject to CFATS reporting requirements.

certain agricultural producers to report their chemical holdings to DHS.[36] In addition, DHS's reporting threshold for ammonium nitrate fertilizer only applies to quantities held in transportable containers such as cylinders, bulk bags, bottles (inside or outside of boxes), cargo tanks, and tank cars.[37] In addition, EPCRA does not require retailers to report fertilizer held for sale to the ultimate customer. However, an August 2013 chemical advisory on ammonium nitrate issued jointly by EPA, OSHA, and ATF clarified that EPCRA requires fertilizer distributors to report ammonium nitrate that is blended or mixed with other chemicals on site. In addition, as previously noted, some facilities may not report to DHS because they have amounts of ammonium nitrate that are below DHS's reporting thresholds.[38]

In addition, some facilities may not be included in either DHS's or states' data because they fail to submit their required reports, but the magnitude of underreporting is not known. DHS officials acknowledged that some facilities fail to file the required forms. The facility in West, Texas had not filed a CFATS report to DHS but, in 2012, this facility filed the required EPRCA form with the state, reporting that it had 270 tons of ammonium nitrate. According to DHS officials, the agency does not know for certain whether the West, Texas facility should have reported its ammonium nitrate to DHS because the agency did not visit the facility after the explosion and it does not know the manner in which the facility held its ammonium nitrate prior to the explosion. Following the explosion at the facility in West, Texas, DHS obtained data from the state of Texas and compared the state data to the facilities that reported to DHS. As a result of this data matching effort, DHS sent out 106 letters to other potentially noncompliant facilities in Texas. According to DHS, many of the Texas facilities that received the letter said they do not actually possess ammonium nitrate or do not meet the criteria to require reporting under CFATS. DHS has used EPA's Risk Management Program (RMP) database to try and identify such facilities holding other chemicals, but it cannot use the RMP database to identify all facilities with ammonium nitrate because ammonium nitrate is not covered by EPA's RMP regulations. In addition, DHS officials told us the agency is in the process of comparing its list of facilities that reported to DHS

[36] See 42 U.S.C. § 11021(e)(5) and Notice to Agricultural Facilities About Requirement To Complete Chemical Security Assessment Tool Top-Screen, 73 Fed. Reg. 1640 (Jan. 9, 2008).

[37] DHS's CFATS regulations provide that, in calculating whether a facility possesses a threshold amount of a chemical that poses a theft or diversion risk, the facility shall only include those chemicals that are in transportation packaging as defined by DOT regulations. 6 C.F.R. § 27.203(c). DHS considers ammonium nitrate fertilizer a chemical of interest because it can be stolen or otherwise diverted to make explosives. According to DHS officials, ammonium nitrate fertilizer stored in bulk does not have to be reported because it is more difficult to transport.

[38] 6 C.F.R. § 27.203(c) and 6 C.F.R. pt. 27, app. A.

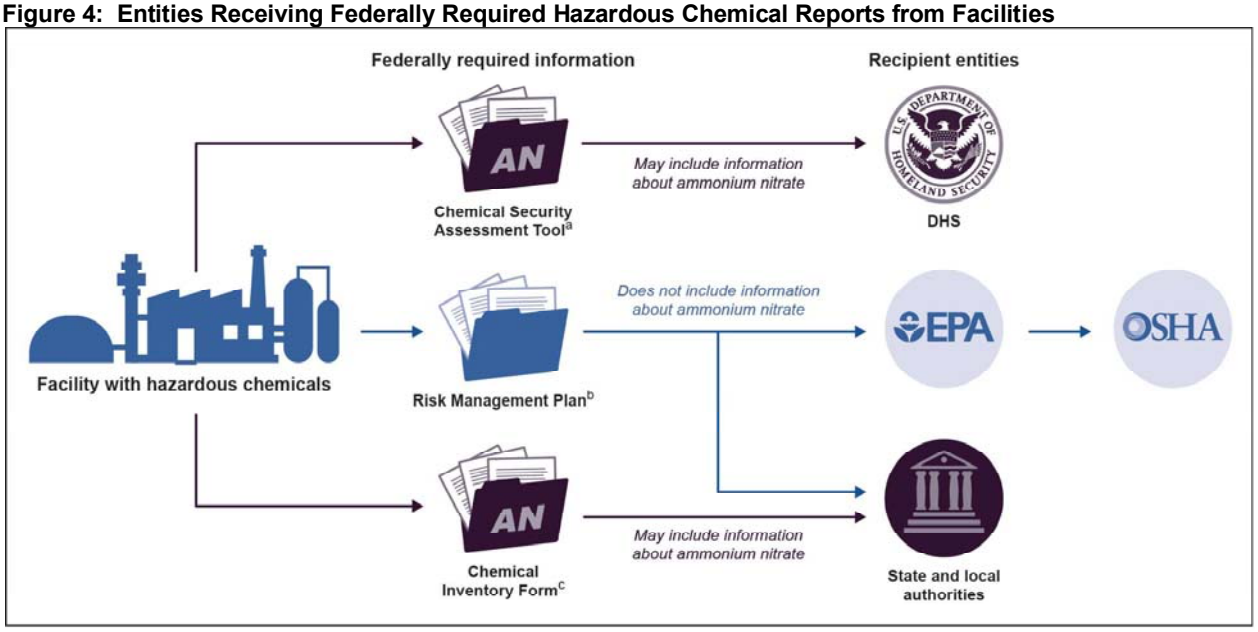
under the CFATS program to ATF's list of facilities that have federal explosives licenses and permits to identify noncompliance facilities, but this effort had not been completed at the time of our review.

OSHA Lacks Access to Data on Facilities That Have Ammonium Nitrate

OSHA has limited access to data collected by other agencies to use in identifying facilities with ammonium nitrate. DHS does not currently share its CFATS data with OSHA, although DHS officials told us they were not aware of anything prohibiting DHS from doing so. While EPA shares data from its RMP with OSHA on a quarterly basis, the data do not include information on ammonium nitrate because ammonium nitrate is not covered by EPA's RMP regulations. As previously discussed, under section 312 of EPCRA , facilities are required to annually report information to state and local authorities on the types and quantities of certain hazardous chemicals present at their facilities, which may include ammonium nitrate. Facilities that possess reportable quantities of ammonium nitrate submit this information electronically or on paper forms, and the state and local entities maintain copies of these forms. However, according to agency officials, the EPCRA data are not shared directly with federal agencies, including OSHA, EPA, or DHS (see fig. 4). Members of the public and other entities—including federal agencies—may submit written requests to the designated state or local authority for information on individual facilities that may have ammonium nitrate, but lists of all facilities in a state that have submitted these data, including those that reported having ammonium nitrate, are not publicly available.[39] In certain states we contacted, officials indicated data on individual facilities could be requested from the state, but that the requester would have to request data on specific facilities to obtain information on the chemicals they hold. OSHA officials cited the lack of access to data on facilities with ammonium nitrate as a major reason they would have difficulty designing an inspection program to target such facilities. EPA officials, however, noted that EPCRA is primarily intended to provide information to state and local officials, not to other federal agencies.

[39] See 42 U.S.C. § 11022(e)(3).

Figure 4: Entities Receiving Federally Required Hazardous Chemical Reports from Facilities



Source: GAO review of federal regulations and interviews with federal officials.

[a] DHS's Chemical Security Assessment Tool is used for submitting reports under DHS's CFATS program.

[b] A risk management plan is required under EPA's RMP regulations.

[c] The Chemical Inventory Form is used for submitting reports under section 312 of EPCRA. EPA publishes model forms; however alternative formats are permitted provided they comply with EPCRA and EPA's regulations.

The University of Texas at Dallas has a database (called E-Plan) that contains EPCRA data from over half of the states, but federal agencies have made limited use of it. University staff developed the E-Plan database in 2000 with funding from EPA to facilitate EPCRA reporting and provide first responders rapid access to information on chemical facilities in emergency situations. In many local areas, first responders and emergency services personnel can use the E-Plan data when they prepare for and respond to emergencies such as fires. According to E-Plan administrators, OSHA staff helped develop the database, but currently OSHA does not use E-Plan. EPA staff told us that some EPA regional offices have used the E-Plan database to assess compliance with the agency's RMP reporting requirements. DHS officials told us the agency does not use E-Plan data to assess compliance with CFATS requirements. DHS officials also explained that, while the database could contain useful information, it is incomplete. Some states do not submit data to E-Plan at all, and other states' data are incomplete. In addition, participation in E-Plan is voluntary and, even among those states that participate, some states do not share their data with federal agencies.

Ongoing Efforts to Help Federal Agencies Improve Their Efforts to Share Data on Chemical Facilities

The Chemical Facility Safety and Security Working Group established by the August 2013 Executive Order has begun its efforts to develop proposals for improving information sharing, but this work has not been completed. The working group has held listening sessions throughout the country seeking input from interested parties on options for making improvements in chemical safety and security. It also has launched a pilot program in New York and New Jersey aimed at improving access to data on chemical facilities for federal, state, local, and tribal governments. In addition, the working group is evaluating how federal agencies can work with states to enhance the states' roles as information sharing organizations, including options for sharing RMP, CFATS, and EPCRA data. Finally, it is exploring ways for federal and state agencies to share information and exchange data to, among other things, identify chemical facilities that are not in compliance with safety and security requirements. For example, DHS and EPA are comparing their CFATS and RMP data to determine if the CFATS data include facilities that should also have reported under the RMP. As a result, EPA has begun sending notification letters to facilities requesting information to help determine if the facility is subject to RMP requirements. Because the RMP regulations do not currently cover ammonium nitrate, however, this strategy would not be useful for identifying facilities that have ammonium nitrate. The federal working group is also sharing information to, among other things, identify whether additional facilities have failed to report under CFATS and is exploring whether EPA software offered to states to facilitate EPCRA reporting could also provide a vehicle to enhance access to the reports while meeting security objectives.

OSHA Has Not Focused Its Enforcement Efforts on Ammonium Nitrate and EPA Has Not Regulated It as a Hazardous Material

OSHA has regulations for the storage of ammonium nitrate, but the agency has not focused its enforcement resources on the use of ammonium nitrate by the fertilizer industry, which is a primary user. EPA, on the other hand, has regulations requiring risk management planning by facilities that have certain hazardous chemicals, but these regulations do not apply to ammonium nitrate.

OSHA's Regulations for Explosives and Blasting Agents List Substantive Requirements for the Storage of Ammonium Nitrate

OSHA's Explosives and Blasting Agents regulations—first issued in 1971—include provisions for the storage of both explosives grade and fertilizer grade ammonium nitrate in quantities of 1,000 pounds or more.[40] OSHA based these regulations on two 1970 consensus standards developed by the National Fire Protection Association (NFPA).[41] Few significant changes have been made to these regulations since they were first issued, although the National Fire Protection Association periodically reviews and updates its standards.[42] OSHA's regulations include requirements that could reduce the fire and explosion hazards associated with ammonium nitrate, such as required fire protection measures, limits on stack size, and requirements related to separating ammonium nitrate from combustible and other contaminating materials. However, the regulations do not categorically prohibit employers from storing ammonium nitrate in wooden bins and buildings. In addition, if the facilities were in existence at the time the initial regulations were issued in 1971, OSHA's regulations allow the use of storage buildings not in strict conformity with the regulations if such use does not constitute a hazard to life.[43] Some of the provisions of OSHA's ammonium nitrate storage regulations are described in table 3.

[40] 29 C.F.R. § 1910.109(i). These provisions apply to the storage of ammonium nitrate in the form of crystals, flakes, grains, or prills including fertilizer grade, dynamite grade, nitrous oxide grade, technical grade, and other mixtures containing 60 percent or more ammonium nitrate by weight but do not apply to blasting agents.

[41] NFPA is an independent nonprofit organization that convenes technical committees to develop national codes and standards intended to minimize the possibility and effects of fire and other risks. NFPA codes and standards are developed by consensus by committees composed of representatives from the government, industry, fire associations, and other organizations.

[42] Unlike OSHA's regulations, consensus standards are voluntary.

[43] 29 C.F.R. § 1910.109(i)(2)(iii)(e).

Table 3: Ammonium Nitrate Storage Topics Addressed in Selected Provisions of OSHA's Explosives and Blasting Agents Regulations

Topic	Summary of Selected Provisions	Legal Citation(s)
Who must comply	All persons storing, having, or keeping ammonium nitrate, and the owner or lessee of any building, premises, or structure in which ammonium nitrate is stored in quantities of 1,000 pounds or more.	29 C.F.R. § 1910.109(i)(2)(i).
	Applies to the storage of [solid] ammonium nitrate, including fertilizer grade, dynamite grade, nitrous oxide grade, technical grade, and other mixtures containing 60 percent or more ammonium nitrate by weight, but does not apply to blasting agents.	29 C.F.R. § 1910.109(i)(1)(i)(a).
	Certain additional exceptions apply.	29 C.F.R. § 1910.109(i)(1)(i)(b)-(c).
Storage building construction	The wall on the exposed side of a storage building within 50 feet of a combustible building, forest, piles of combustible materials and similar exposure hazards shall be of fire-resistive construction. In lieu of the fire-resistive wall, other suitable means of exposure protection such as a free standing wall may be used.	29 C.F.R. § 1910.109(i)(2)(iii)(c).
	All flooring in storage and handling areas shall be of noncombustible material or protected against impregnation by ammonium nitrate and shall be without open drains, traps, tunnels, pits, or pockets into which any molten ammonium nitrate could flow and be confined in the event of fire.	29 C.F.R. § 1910.109(i)(2)(iii)(d).
	The continued use of an existing storage building or structure not in strict conformity with [these provisions] may be approved in cases where such continued use will not constitute a hazard to life.	29 C.F.R. § 1910.109(i)(2)(iii)(e).
Size of piles and separation distances, when stored in bags, drums or other containers	Minimum distance from walls (bags): 30 inches.	29 C.F.R. § 1910.109(i)(3)(ii)(b).
	Maximum pile height and width: 20 feet.	29 C.F.R. § 1910.109(i)(3)(ii)(c).
	Maximum pile length: 50 feet. Where the building is of noncombustible constriction or is protected by automatic sprinklers the length of the piles is not limited.	
	Minimum distance from the roof: 36 inches.	
	Aisles shall be provided to separate piles by a clear space of at least 3 feet. At least one service or main aisle in the storage area shall be not less than 4 feet wide.	29 C.F.R. § 1910.109(i)(3)(ii)(d).
Storage bin construction for bulk ammonium nitrate	Due to the corrosive and reactive properties of ammonium nitrate, and to avoid contamination, galvanized iron, copper, lead, and zinc shall not be used in a bin construction unless suitably protected. Aluminum bins and wooden bins protected against impregnation by ammonium nitrate are permissible. The partitions dividing the ammonium nitrate storage from other products which would contaminate the ammonium nitrate shall be of tight construction.	29 C.F.R. § 1910.109(i)(4)(ii)(b).
Separation from combustible and other contaminating materials	Ammonium nitrate shall be in a separate building or shall be separated by approved type firewalls of not less than 1 hour fire-resistance rating from storage of organic chemicals, acids, or other corrosive materials, materials that may require blasting during processing or handling, compressed flammable gases, flammable and combustible materials or other contaminating substances.	29 C.F.R. § 1910.109(i)(5)(i)(a).
Fire protection	Not more than 2,500 tons of bagged ammonium nitrate shall be	29 C.F.R. §

	stored in a building or structure not equipped with an automatic sprinkler system.	1910.109(i)(7)(i).
	Suitable fire control devices such as small hose or portable fire extinguishers shall be provided throughout the warehouse and in the loading and unloading areas.	29 C.F.R. § 1910.109(i)(7)(ii)(a).
	Water supplies and fire hydrants shall be available in accordance with recognized good practices.	29 C.F.R. § 1910.109(i)(7)(ii)(b).

Source: Ammonium nitrate storage provisions of OSHA's regulations, 29 C.F.R. § 1910.109(i).

Note: This table is not intended to be comprehensive; additional requirements or exceptions may apply to each topic that are not described here. States with their own OSHA-approved occupational safety and health program must have state standards that are at least as effective as OSHA's.

Recently, OSHA, EPA, and ATF jointly issued a chemical advisory that recommends that facilities store ammonium nitrate in non-combustible buildings.[44] Similarly, following the explosion in West, Texas, the National Fire Protection Association is considering changes to its ammonium nitrate storage provisions, which are part of its hazardous materials consensus standard, including restricting the use of wood to store ammonium nitrate.

In addition to storage requirements, OSHA's Hazard Communication regulations require that employers whose workers are exposed to hazardous chemicals, including ammonium nitrate, inform their workers of the dangers and train them to handle the materials appropriately. Employers are required to use labels, training, and safety data sheets to inform workers of chemical hazards in the workplace.[45] Safety data sheets are written documents with details on the hazards associated with each chemical, measures workers can take to protect themselves, actions workers should take in case of an emergency, and safety precautions for handling and storing the chemical.

[44] *Chemical Advisory: Safe Storage, Handling, and Management of Ammonium Nitrate.* EPA 555-S-13-001. Washington, D.C.: August 2013.

[45] 29 C.F.R. § 1910.1200. The regulations do not include a list of chemicals and threshold amounts that would trigger application of the regulations. Rather, the regulations apply to any chemical which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency, subject to certain exceptions. In its 2012 revisions to the Hazard Communication regulations, OSHA changed the name of material safety data sheets to safety data sheets. See Hazard Communication, 77 Fed. Reg. 17,574 (March 26, 2012).

OSHA Has Conducted Little Outreach to the Fertilizer Industry to Increase Awareness of Its Ammonium Nitrate Storage Regulations

Until the explosion in West, Texas, OSHA had not reached out to the fertilizer industry to inform its members of OSHA's requirements for the storage of ammonium nitrate fertilizer. An OSHA official told us the agency has not traditionally informed the fertilizer industry about these regulations. However, another OSHA official said agency officials met with industry representatives after the explosion at the facility in West, Texas and, based on that meeting, concluded that the fertilizer industry is "well aware" of the agency's storage regulations. OECD's Guiding Principles for Chemical Accident Prevention, Preparedness, and Response recommend that public authorities provide clear, easy-to-understand guidance to facilities on how regulatory objectives and requirements can be met.

OSHA recently published information about how the agency's Explosives and Blasting Agents regulations apply to ammonium nitrate fertilizer. The agency provides employers with training, technical assistance, and information through its website on a variety of safety and health topics.[46] Recently, OSHA updated its website to refer to its storage regulations for ammonium nitrate fertilizer. The August 2013 chemical advisory contains information on OSHA's ammonium nitrate storage regulations, stating that OSHA's Explosives and Blasting Agents regulations contain requirements for the storage of all grades of ammonium nitrate, including fertilizer grade ammonium nitrate. In addition, in February 2014, OSHA announced that the agency is working with the fertilizer industry to remind employers of the importance of safely storing and handling ammonium nitrate. OSHA published a letter on its website that provides employers with legal requirements and best practice recommendations for safely storing and handling ammonium nitrate. In the letter, OSHA states that the agency will enforce the requirements of 29 C.F.R. § 1910.109(i) for storage of ammonium nitrate, including at facilities in non-explosives industries. According to the announcement, fertilizer industry associations will share the letter with facilities across the country.

Fertilizer industry representatives we interviewed said that, prior to the explosion in West, Texas, they did not know that OSHA's ammonium nitrate storage regulations applied to the fertilizer industry, and they suggested that OSHA reach out to the fertilizer industry to help

[46] Section 21 of the OSH Act requires OSHA to establish programs to educate and train employers and employees in the recognition, avoidance, and prevention of unsafe or unhealthful working conditions, and to consult with and advise employers, employees, and organizations representing employers and employees as to effective means of preventing occupational injuries and illnesses. 29 U.S.C. § 670(c).

prevent another incident. Industry representatives explained that their understanding was based on a proposed rule published by OSHA in the *Federal Register* on April 13, 2007, which proposed revisions to the Explosives and Blasting Agents regulation.[47] In that notice, OSHA proposed a change to the ammonium nitrate storage requirements "to clarify that OSHA intends the requirements to apply to ammonium nitrate that will be used in the manufacture of explosives." Although this proposed rule was never finalized, the industry representatives told us they relied on this statement to mean OSHA did not intend the storage requirements to apply to ammonium nitrate fertilizer.

In addition, we reviewed the safety data sheets developed by four U.S. producers of solid ammonium nitrate fertilizer and found that only one company's sheet listed OSHA's Explosives and Blasting Agents regulations as applicable to the storage and handling of ammonium nitrate fertilizer.[48] An industry representative who assists agricultural retailers with regulatory compliance said he reviewed the regulatory information sections in his clients' safety data sheets for ammonium nitrate fertilizer and none of them referred to OSHA's Explosives and Blasting Agents regulations. A representative from one national fertilizer industry association said it would be helpful if OSHA took additional steps to explain its interpretation of the applicable requirements and reach out to the fertilizer industry so that affected companies are better informed. A representative from another national agricultural industry group suggested that OSHA develop and disseminate a compliance assistance tool or checklist to ensure that facilities are aware of and in compliance with the applicable regulations.

The fertilizer industry is developing a voluntary program called Responsible Ag to promote compliance with federal regulations among fertilizer facilities. Officials from the Fertilizer Institute and the Agricultural Retailers Association told us they plan to consolidate federal regulatory requirements for fertilizer retail facilities into one comprehensive checklist and provide third party audits to retailers based on a checklist they have developed. In addition, officials with the Asmark Institute, a nonprofit resource center for agricultural retailers in the United States, said they developed their own compliance assessment tool for agricultural retailers. The Fertilizer

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[47] Explosives, Part III, 72 Fed. Reg. 18,792 (Apr. 13, 2007).

[48] Manufacturers are required to develop safety data sheets for users of their hazardous chemical products, including ammonium nitrate fertilizer, under OSHA's Hazard Communication regulations. Although not required by OSHA, safety data sheets typically include a regulatory information section.

Institute and the Agricultural Retailers Association selected the Asmark Institute to develop a database that will include information on audit reports and scores from the third party audits. This initiative will be modeled after a voluntary audit program in Minnesota for agricultural retailers to help them improve compliance with federal and state regulations. According to OSHA officials, OSHA has not been involved in the development of this industry initiative.

OSHA Has No Program for Targeted Inspections of Facilities with Ammonium Nitrate

Although OSHA has a national enforcement program that targets certain chemical facilities for inspection, this program does not systematically cover facilities with ammonium nitrate. OECD chemical safety guidance suggests public authorities periodically inspect the safety performance of hazardous facilities. OSHA randomly selects facilities for inspection as part of a national emphasis program for chemical facilities it initiated in 2011. However, these inspections are for facilities and chemicals covered under its Process Safety Management (PSM) regulations, which do not include ammonium nitrate. According to OSHA officials, facilities that blend and store ammonium nitrate fertilizer fall outside the scope of this national emphasis program. When we asked whether OSHA might expand its national emphasis program to focus on ammonium nitrate fertilizer facilities, officials said that the agency is not planning on targeting these facilities, in part because OSHA has no means of identifying them.[49]

In addition, OSHA is not likely to target facilities with ammonium nitrate for inspection because of its limited resources, and because these facilities often do not meet OSHA's current inspection priorities.[50] OSHA currently conducts inspections with its own personnel rather than through third parties. Therefore, the number of inspections OSHA and the states can perform each year is limited by the size of its inspection workforce. According to OSHA officials, OSHA and the states have about 2,200 inspectors who inspected about 1 percent of the 8 million covered employers in fiscal year 2012. Among OSHA's highest priorities for inspecting worksites are responding to major accidents and employee complaints. In fiscal year 2012,

[49] OSHA officials said the agency considers facilities that are classified as the highest risk category in EPA's RMP database to likely be subject to OSHA's PSM regulations. OSHA estimates that about 8,480 facilities are covered by its PSM regulations. As previously stated, although OSHA acquires data on facilities with hazardous chemicals from EPA's RMP database, that database does not include information on facilities with ammonium nitrate.

[50] As part of its enforcement efforts, OSHA conducts inspections of worksites, as authorized under the OSH Act. 29 U.S.C. § 657.

OSHA reported that 44 percent of the agency's inspections were unplanned inspections, which include inspections initiated in response to an accident or complaint. OSHA also targets certain industries for planned inspections that have high rates of workplace injury and illness. For example, OSHA reported that 55 percent of OSHA's planned inspections in fiscal year 2012 were inspections of worksites in the construction industry.

OSHA has rarely issued citations for violations of its ammonium nitrate storage regulations at fertilizer facilities. OSHA officials told us a citation for a violation of the agency's ammonium nitrate storage regulations was issued as the result of an inspection of a fertilizer facility one other time prior to the explosion in West, Texas.[51] In that case, OSHA inspected a Florida-based fertilizer manufacturer in 1997 in response to a complaint, and cited the company for 30 violations, one of which was a violation of its ammonium nitrate storage requirements. In addition, according to OSHA officials, within the last 5 years, none of the 21 states that operate their own safety and health programs have cited any employers for improper storage or handling of ammonium nitrate.

[51] In October 2013, OSHA cited the West, Texas facility and proposed penalties of $118,300 for violations of its ammonium nitrate storage regulations and other OSHA regulations. According to OSHA officials, these citations have been contested by the employer and are currently pending before the Occupational Safety and Health Review Commission. OSHA last inspected the West, Texas facility in 1985. At that time, OSHA fined the facility $30 for violations of its regulations on storage and handling of anhydrous ammonia. Anhydrous ammonia is a colorless gas that can be compressed to make a liquid fertilizer. Anhydrous ammonia emits pungent, suffocating fumes and is considered a high health hazard because it is corrosive to the skin, eyes, and lungs. Anhydrous ammonia is also flammable and can explode under certain conditions.

OSHA Is Prohibited from Inspecting Some Facilities with Ammonium Nitrate That Have 10 or Fewer Employees

Under a provision regularly included in the annual appropriations act, OSHA is prohibited from conducting planned safety inspections at worksites that are considered small employers—those with 10 or fewer employees—in certain low hazard industries, as determined by their injury and illness rates.[52] Although the number of facilities exempted from OSHA inspections under this provision is unclear, we found that, of the facilities that reported to DHS as of August 2013, 60 facilities—about 4 percent of the 1,345 facilities that reported to DHS— reported having 10 or fewer employees and had an industry code with a lower than the average workplace injury and illness rate (see table 4).[53] As a result, according to OSHA officials, this provision could have hindered the agency's enforcement of its ammonium nitrate storage regulations at these facilities.

OSHA's fiscal year 2015 budget request asks Congress to consider amending OSHA's appropriation language to allow the agency to perform targeted inspections of small establishments that have the potential for catastrophic incidents, such as those with processes covered by OSHA's PSM or EPA's RMP regulations. In the budget request, OSHA states that the current appropriations language limits the agency's ability to conduct inspections, and neither the number of workers in a company nor low injury and illness rates is predictive of the potential for catastrophic accidents that can damage whole communities.

[52] See, for example, Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Act, 2012, Pub. L. No. 112-74, div. F, tit. I, 125 Stat. 786, 1059-60 (2011), which provides that, subject to certain exceptions, no appropriated funds shall be used to enforce any regulation under the OSH Act "with respect to any employer of 10 or fewer employees who is included within a category having a[n] … occupational injury and illness rate …less than the [most recent] national average," as published by the Department of Labor's Bureau of Labor Statistics. The exceptions include, among others, inspections for health hazards and unplanned inspections (such as those conducted in response to employee complaints or serious accidents). The Department of Labor's Bureau of Labor Statistics estimates workplace injury and illness rates by industry using North American Industry Classification System industry codes. To identify which industries are subject to OSHA's enforcement exemption, OSHA periodically updates one of its enforcement directives to list the most current North American Industry Classification System codes for each industry with an average workplace injury and illness rate below the national average.

[53] Facilities are generally required to report to DHS if they have 400 pounds or more of explosives grade ammonium nitrate or 2,000 pounds or more of fertilizer grade ammonium nitrate in transportation packaging.

Table 4: Number of Facilities Reporting More Than Threshold Amounts of Ammonium Nitrate to DHS That May be Exempt from Planned OSHA Safety Inspections Based on Industry Classification and Number of Employees

NAICS industry code	NAICS industry code description	Number of facilities with this code that are potentially exempt from programmed inspection based on reporting 10 or fewer employees
111140	Wheat Farming	2
111199	All Other Grain Farming	1
115112	Soil Preparation, Planting, and Cultivating	21
213113	Support Activities for Coal Mining	2
213115	Support Activities for Nonmetallic Minerals (except Fuels)	7
238910	Site Preparation Contractors	4
325120	Industrial Gas Manufacturing	4
325311	Nitrogenous Fertilizer Manufacturing	1
423820	Farm and Garden Machinery and Equipment Merchant Wholesalers	2
424690	Other Chemical and Allied Products Merchant Wholesalers	14
482112	Short Line Railroads	1
541380	Testing Laboratories	1
Total		**60**

Source: GAO review of DHS data reported as of August 2013 and industry codes listed in OSHA's directive regarding the Enforcement Exemptions and Limitations under the Appropriations Act, CPL 02-00-051, changes to Appendix A (effective February 22, 2013).

Note: Facilities are generally required to report to DHS if they have 400 pounds or more of explosives grade ammonium nitrate or 2,000 pounds or more of fertilizer-grade ammonium nitrate in transportation packaging. Facilities are listed in this table if they (1) reported a North American Industry Classification System (NAICS) code to DHS that had a workplace injury and illness rate below the national average as of 2011and (2) reported having 10 or fewer employees.

Other OSHA and EPA Chemical Safety Regulations Do Not Apply to Facilities with Ammonium Nitrate

OSHA's PSM regulations for chemical safety do not cover ammonium nitrate.[54] In response to a requirement in the Clean Air Act Amendments of 1990, OSHA issued its PSM regulations in 1992 to help prevent accidents involving highly hazardous chemicals, including toxic, flammable, highly reactive, and explosive substances. These regulations apply to processes involving listed chemicals in amounts at or above threshold quantities. Employers subject to the

[54] 29 C.F.R. § 1910.119. OSHA's list of highly hazardous chemicals is found at 29 C.F.R. § 1910.119, app. A.

PSM regulations are required to take specified steps, which include evaluating the hazards associated with the process, as well as developing and implementing operating procedures, employee training, emergency action plans, and compliance audits at least every 3 years, among other requirements.[55] Despite the hazards of ammonium nitrate, this chemical is not listed as one of the chemicals subject to these regulations. OSHA officials told us they did not know why ammonium nitrate was not included when the regulation was first issued.[56] According to the August 2013 chemical advisory, although ammonium nitrate is not covered by the PSM regulations, the production or use of ammonium nitrate may involve PSM-listed chemicals, and the manufacture of explosives, which may involve ammonium nitrate, is covered by the regulations. In the late 1990s, OSHA staff drafted a proposal for expanding PSM regulations to cover ammonium nitrate and other reactive chemicals, but it was not reviewed by agency policy officials and was never formally published in the *Federal Register* for public comment.[57]

In addition, retail facilities, which may include facilities that store and blend fertilizer for direct sale to end users, are exempt from OSHA's PSM regulations. In the preamble to the final rule for the PSM regulations, OSHA stated that retailers are not likely to store large quantities of hazardous chemicals, and that a large chemical release would be unlikely. While the facility in West, Texas stored large quantities of anhydrous ammonia, a chemical covered by the PSM regulations, OSHA officials told us that the PSM regulations would not apply to the facility because it was a retail outlet.

[55] A process means any activity involving a highly hazardous chemical including any use, storage, manufacturing, handling, or the on-site movement of such chemicals, or a combination of these activities.

[56] According to OSHA officials, ammonium nitrate met criteria the agency used to develop the list of chemicals subject to the PSM regulations, but ammonium nitrate was not included in the final regulations and the agency could not find documentation that would explain why it was not included. The preamble to the PSM regulations indicates the agency decided to include substances with the two highest or most dangerous reactivity ratings from NFPA's Hazardous Chemicals Data document 49 (substances rated 3 or 4 by NFPA). Ammonium nitrate has a reactivity rating of 3 from NFPA, but was not included in the list of chemicals subject to the PSM regulations.

[57] This proposal to amend the PSM regulations (RIN 1218-AB63) appeared on OSHA's spring 1997 regulatory agenda and was removed as of the fall 2001 agenda. OSHA commissioned a study that was completed in 2000 by CONSAD Research Corporation, which included a preliminary chemical and industry profile and an economic analysis of the impacts of adding reactive chemicals to the scope of the PSM regulations, including ammonium nitrate.

In addition, other chemical safety regulations issued by EPA do not apply to facilities with ammonium nitrate.[58] EPA's RMP regulations, issued in 1996 in response to a provision of the Clean Air Act Amendments of 1990, require covered chemical facilities to develop and implement a risk management program, but ammonium nitrate is not included on the list of chemicals that would trigger the requirements.[59] EPA's RMP regulations require facilities that handle more than threshold amounts of certain chemicals to implement a risk management program to guard against the release of chemicals into the air and surrounding environment. Covered facilities must develop their own risk management plans, and some facilities must also develop an emergency response program and conduct compliance audits, among other requirements. Covered facilities must also submit their risk management plans to EPA, including data on the regulated substances handled, and prepare a plan for a worst-case chemical release scenario.

Although EPA initially included high explosives in its list of regulated substances, which would include explosives grade ammonium nitrate, these explosives were subsequently removed from the list as a result of a legal settlement.[60] EPA officials also told us that fertilizer grade ammonium nitrate was not considered for its list for RMP because they had determined that it did not meet the criteria EPA established to implement the statute.[61] EPA officials told us that ammonium nitrate could have been included in the RMP regulations, but ammonium nitrate was not included because it was not considered a toxic or flammable chemical, which were the criteria EPA used when the agency first developed the regulations. Accordingly, ammonium nitrate is not a covered chemical and EPA inspectors do not review facilities' risk management

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[58] According to Chemical Safety Board officials, in 2002, the CSB recommended that OSHA and EPA expand the PSM and EPA regulations to include reactive chemicals, which would include ammonium nitrate. For more information, see U.S. Chemical Safety and Hazard Investigation Board, Hazard Investigation: Improving Reactive Hazard Management, Report No. 2001-01-H, Washington D.C.: October 2002.

[59] 40 C.F.R. pt. 68. EPA's list of regulated toxic and flammable substances is found at 40 C.F.R. § 68.130.

[60] As part of settlement agreements resolving legal challenges to EPA's list by members of the explosives industry, EPA agreed to de-list high explosives and the industry members agreed to develop and implement certain safety practices. EPA concluded that existing regulations and these industry practices were adequate to protect the public. List of Regulated Substances and Thresholds for Accidental Release Prevention; Amendments, 63 Fed. Reg. 640, 641 (Jan. 6, 1998).

[61] When it established its list of regulated substances, EPA included substances that met specified criteria for toxic, flammable, and explosive substances. For explosives, EPA selected substances that were given a certain explosive classification by the Department of Transportation. List of Regulated Substances and Thresholds for Accidental Release Prevention, 59 Fed. Reg. 4478 (Jan. 31, 1994). The Department of Transportation does not classify ammonium nitrate fertilizer as an explosive. 49 C.F.R. § 172.101.

plans for this chemical during their RMP inspections. In 2006, EPA conducted an onsite inspection of the West, Texas facility, but the inspection focused on anhydrous ammonia, not ammonium nitrate.

Under the Executive Order, OSHA and EPA Are Seeking Information on Expanding Regulation and Oversight of Ammonium Nitrate, but Have Not Yet Proposed Any Regulatory Changes

In response to the August 2013 Executive Order on Improving Chemical Facility Safety and Security, OSHA and EPA, as part of the federal working group, have invited public comment on a wide range of policy options for overseeing the housing and handling of hazardous chemicals in the United States. Because they are still evaluating these options, the agencies have not issued any notices of proposed rulemaking. As directed by the Executive Order, in December 2013, OSHA issued a Request for Information on potential revisions to its PSM and related regulations, including its ammonium nitrate storage regulations.[62] OSHA's Request for Information also seeks public input on changing the agency's enforcement policy concerning the retailer exemption in the PSM regulations. In the Request for Information, OSHA states that "The West Fertilizer facility is not currently covered by PSM, however it is a stark example of how potential modernization of the PSM standard may include such facilities and prevent future catastrophe." In addition, as chair of one of the workgroups established to implement the Executive Order, OSHA solicited public input in January 2014 on federal policy options for improved chemical safety and security, including whether to expand OSHA's PSM regulations and EPA's RMP regulations to cover ammonium nitrate, among other options.[63] This solicitation also sought public input on whether federal agencies should examine the use of third party audits to promote safe storage and handling of ammonium nitrate. The solicitation defined third party audits as inspections conducted by independent auditors, retained by a chemical facility,

[62] Process Safety Management and Prevention of Major Chemical Accidents, 78 Fed. Reg. 73,756 (Dec. 9, 2013).

[63] These policy options have been published to OSHA's website and public comments may be provided through the website regulations.gov.

who make process safety and regulatory compliance recommendations.[64] In an ongoing pilot project in selected states implemented in response to the Executive Order, federal agencies report improved coordination of inspections, such as sharing inspection schedules, cross-training inspectors, and inter-agency referrals of possible regulatory non-compliance.

Some Countries Regulate and Oversee Ammonium Nitrate By Imposing Requirements on Facilities, Conducting Inspections, and Supporting Industry Initiatives to Promote Compliance

Other Countries' Approaches Include Risk Assessments and Restrictions on Where and How Ammonium Nitrate Can Be Stored

According to foreign officials and government documents, Canada and the three EU countries we contacted—France, Germany, and the United Kingdom—require facilities with specified quantities of ammonium nitrate, including fertilizer grade ammonium nitrate, to assess its risk and develop plans or policies to control the risks and mitigate the consequences of accidents.[65] Like the United States, these countries are members of the OECD, which has published best practices for managing the risks of chemical accidents. [66] The OECD publication includes guidance on preventing and mitigating the consequences of chemical accidents, preparedness planning, and land use planning, among other things.[67] For example, OECD's guidance recommends that regulatory authorities ensure that facilities with hazardous substances assess

[64] In December 2012, the Administrative Conference of the United States, an independent federal agency dedicated to improving the regulatory process, published a recommendation on agency use of third-party programs to assess regulatory compliance. The recommendation refers to existing third-party inspection programs in which regulated entities generally contract with and pay third parties to carry out activities such as facility inspections. Regulatory agencies then adopt new roles in coordinating and overseeing these third parties. The Administrative Conference of the United States recommended that federal agencies consider various factors, such as resources and incentives to participate in a third-party inspection program, when deciding whether or not to develop such a program. It also acknowledges that certain statutory or other legal restrictions may preclude an agency from using third parties to conduct inspections and other compliance assistance activities. Adoption of Recommendations, 78 Fed. Reg. 2939, 2941-43 (Jan. 15, 2013).

[65] We did not conduct an independent legal analysis to verify the information provided about the laws, regulations, or policies of the foreign countries selected for this study.

[66] The OECD is an intergovernmental organization in which representatives meet to coordinate and harmonize policies, discuss issues of mutual interest, and respond to international concerns. Currently, there are 34 member countries.

[67] *OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response: Guidance for Industry (including Management and Labour), Public Authorities, Communities, and other Stakeholders*, OECD 2003.

the range of possible accidents and require hazardous facilities to submit reports describing the hazards and the steps taken to prevent accidents.

With respect to assessing the risks of ammonium nitrate, according to Canadian officials and Canadian government documents, ammonium nitrate is regulated under the country's Environmental Emergency Regulations, which include risk management provisions. According to guidance published by Environment Canada, a federal-level regulatory agency, facilities that store 22 tons or more of ammonium nitrate must develop and implement an environmental emergency plan.[68] In developing an emergency plan, facilities are directed to analyze the risks posed during the storage and handling processes for certain chemicals and adopt practices to reduce the risks, taking into consideration the impact a chemical accident would have on the surrounding community.

According to information provided by EU officials, facilities in the 28 member countries of the EU with specific quantities of ammonium nitrate fertilizer are subject to the Seveso Directive, the EU legislation for facilities that use or store large quantities of certain toxic, explosive, and flammable substances, among other types of chemicals. [69] At a minimum, EU officials told us that EU member countries must comply with the Seveso Directive, although they have the option to adopt more stringent requirements. The legislation was adopted after a chemical accident in Seveso, Italy in 1976 that exposed thousands of people to the toxic chemical known as dioxin. Under the Seveso Directive, last updated in 2012, member countries are to require facilities with large amounts of ammonium nitrate fertilizer to notify the appropriate authority in

[68] This includes mixtures that are 60 percent ammonium nitrate by weight and that are in solid form and mixtures that are 81 percent ammonium nitrate by weight and that are in liquid form.

[69] Currently, the Seveso Directive specifically covers four different types of ammonium nitrate, and reporting requirements for facilities vary depending on the quantity of ammonium nitrate they hold. The four types of ammonium nitrate covered are described in the Seveso Directive as: (1) ammonium nitrate fertilizers capable of self-sustaining decomposition (2) fertilizer grade ammonium nitrate (3) technical grade ammonium nitrate and (4) "off-specs" material and fertilizers not fulfilling the detonation test. Threshold quantities vary depending on the type of ammonium nitrate. Fertilizer grade ammonium nitrate is defined in the Seveso Directive as straight ammonium nitrate-based fertilizers and ammonium nitrate-based compound/composite fertilizers that contain certain percentages of nitrogen from ammonium nitrate by weight. For more specific information, see Annex I of *Directive 2012/18/EU of the European Parliament and of the Council on the Control of Major-Accident Hazards Involving Dangerous Substances, Amending and Subsequently Repealing Council Directive 96/82/EC* (July 4, 2012). For purposes of this report, we focus on examples involving fertilizer grade ammonium nitrate.

their respective country, adopt a major accident prevention policy, and in some cases, develop a detailed safety report (see table 5).[70]

Table 5: Selected Key Requirements and Corresponding Threshold Quantities in the European Union's Seveso III Directive for Facilities with Fertilizer Grade Ammonium Nitrate

Summary of Directive Requirement	Threshold Quantity (in tons)
Notification *Facilities are required to notify the appropriate authority in their country by submitting the names and quantities of chemicals present, activities performed, and details about neighboring establishments, including areas likely to increase the risk or consequences of a major accident.*	1,378
Major-accident prevention policy *Facilities are required to document how they plan to prevent accidents and protect human health and the environment, including identifying and evaluating major hazards and planning for emergencies, among other activities, and submit the document to the appropriate authority in their country.*	1,378
Safety Report *Facilities are required to produce a safety report demonstrating that major accident hazards and scenarios have been indentified and that measures have been taken to prevent such accidents, and send the report to the appropriate authority in their country.*	5,512

Source: The Seveso III Directive and information provided by EU officials.

Note: The Seveso III Directive was adopted on July 4, 2012 and entered into force on August 13, 2012. EU member countries have until June 1, 2015 to implement the Seveso III Directive.

Some countries, such as France and the United Kingdom, have other requirements for notifying authorities about the types and quantities of chemicals at facilities, including certain types of ammonium nitrate. In the United Kingdom, officials told us that facilities with 28 tons or more of certain types of ammonium nitrate must notify the Health and Safety Executive or local authority

[70] According to information provided by EU officials, the EU began regulating ammonium nitrate fertilizer in 1982. Subsequent to the adoption of the original Seveso Directive in 1982, there have been two replacement directives. Seveso II was adopted in 1996 and introduced requirements related to emergency planning and land use planning, among other revisions. Seveso II was amended in 2003 and changes were made to the descriptions of the ammonium nitrate categories and thresholds modifying the criteria for which facilities are covered under the Directive, among other changes. These changes were made based on an analysis of findings from the 2001 accident in Toulouse, France. Seveso III was adopted on July 4, 2012 and entered into force on August 13, 2012. EU member countries have until June 1, 2015 to implement the Seveso III Directive. Revisions include stricter standards for inspections to ensure more effective enforcement, and stricter requirements for providing information to the public, particularly those likely to be affected by a major accident, among other changes. This information was provided and/or reviewed by EU officials, for more details, see European Union, *Directive2012/18/EU of the European Parliament and of the Council on the Control of Major-Accident Hazards Involving Dangerous Substances, Amending and Subsequently Repealing Council Directive 96/82/EC* (July 4, 2012).

and the fire authorities.[71] French officials said that facilities with more than 276 tons of ammonium nitrate fertilizer must notify local authorities about their holdings.[72]

The selected countries we reviewed generally reported having more centralized land use policies that specify where facilities with large quantities of ammonium nitrate should be located. For example, EU officials explained that the Seveso Directive requires member countries to develop and implement land use policies. Through controls on the siting of new Seveso facilities and new developments in the vicinity of such facilities, such as transportation routes and residential areas, they told us, member countries' policies aim to limit the consequences of chemical accidents for human health and the environment. In the United Kingdom, officials told us that facilities intending to store more than 1,102 tons of ammonium nitrate must first receive permission from their local planning authority to do so for relevant ammonium nitrate materials. They explained that these local planning authorities consider the hazards and risks to people in surrounding areas and consult with the Health and Safety Executive prior to granting permission to such facilities.

Three of the countries we reviewed—France, Germany, and the United Kingdom—restrict the use of wood for storage purposes in certain instances, according to information and documents provided by relevant officials. EU officials told us that the Seveso Directive does not prescribe how chemicals, including ammonium nitrate, should be stored. EU countries have developed their own technical standards or rely on industry standards for storing and handling ammonium nitrate. For example, according to information provided by French officials, after several accidents involving ammonium nitrate fertilizer, the government in France launched a working group to update existing ammonium nitrate regulations, including storage and handling requirements. They described the most recent regulations in France, issued in 2010, which

[71] According to United Kingdom officials we interviewed, these requirements apply to grades of ammonium nitrate that are classified as oxidizers. The relevant regulations that require facilities to notify authorities are The Dangerous Substances (Notification and Marking of Sites) Regulations 1990. These regulations are primarily intended to alert fire authorities to any special firefighting hazards likely to exist at facilities. The Health and Safety Executive is a non-departmental United Kingdom government body.

[72] More specifically, according to officials, facilities with more than 276 tons but less than 551 tons of ammonium nitrate fertilizer that is more than 28 percent nitrogen from ammonium nitrate by weight and complies with EU standards, including passing a detonation resistance test, are required to notify local authorities. According to a French official, facilities with 11 tons or more of "off-spec" ammonium nitrate that does not comply with certain EU standards are classified as Seveso facilities.

include updated fire resistance provisions for new and existing facilities banning or restricting the use of materials such as wood and asphalt flooring for storing ammonium nitrate. Specifically, according to documents provided by French officials, the regulations direct facilities not to store ammonium nitrate fertilizer in structures with wood walls or sides.[73] According to an official in Germany, strict storage requirements for using certain types of ammonium nitrate fertilizer have led many farmers to voluntarily use an alternative type of fertilizer, known as calcium ammonium nitrate.[74,75] For example, she explained that, in Germany, certain kinds of ammonium nitrate must be divided into quantities of 28 tons prior to storage, and quantities are separated by concrete walls. In addition, certain ammonium nitrate and ammonium nitrate-based preparations must be separated from combustible materials, for example by brick or concrete walls. Guidance in the United Kingdom also recommends that buildings for storing ammonium nitrate should be constructed of material that does not burn, such as concrete, bricks, or steel, as does the recent advisory in the United States published by OSHA, EPA, and ATF.

Foreign Oversight Approaches and Industry Initiatives Include Guidance on Safe Practices, Requirements for Routine Inspections, and Voluntary Third Party Audit Programs

Guidance on Safe Practices. In the countries we reviewed, government entities developed materials to help facilities with ammonium nitrate fertilizer comply with safety regulations.[76] For example, in the United Kingdom, the government published guidance on storing and handling ammonium nitrate that illustrates proper storage practices and is written in plain language. The

[73] In this example, ammonium nitrate fertilizer refers to solid straight and compound fertilizers with specific percentages of nitrogen from ammonium nitrate by weight.

[74] The German official told us that German regulations apply to the storage, filling, and in-house transport of ammonium nitrate and ammonium nitrate-based preparations. In Germany, ammonium nitrate and ammonium nitrate-based preparations are classified into five groups based on their hazardous properties. For more information, see the Hazardous Substances Ordinance, Federal Institute for Occupational Safety and Health, last amended July 15, 2013.

[75] According to an official we interviewed from an international fertilizer association, using calcium ammonium nitrate, which is a mixture of ammonium nitrate with limestone and/or dolomite, entails some incremental cost associated with the additional weight of the material added to the ammonium nitrate. According to a German official, under normal storage conditions, calcium ammonium nitrate fulfilling certain requirements is considered a safer fertilizer than straight ammonium nitrate fertilizer in terms of preventing accidental detonation, and large protection distances are used for straight ammonium nitrate fertilizer in case of accidental detonation. However, calcium ammonium nitrate fertilizer can still be used to make weapons, such as improvised explosive devices.

[76] OECD's *Guiding Principles for Chemical Accident Prevention, Preparedness and Response* directs public authorities to provide facilities with clear, easy to understand guidance on how regulatory requirements can be met.

United Kingdom also developed a checklist that facilities can use as a compliance tool to determine whether they are meeting safe storage requirements. In Canada, Environment Canada issued a guidance document in 2011 so that facilities covered by its Environmental Emergency Regulations, including facilities with certain types and amounts of ammonium nitrate, can better understand and comply with regulatory requirements.

The EU compiles information about chemical accidents and disseminates publications that include guidance on how facilities can prevent future incidents. Specifically, the EU has a system for reporting major accidents that it uses to collect information from EU member countries and the United States about chemical accidents and tracks the information in a central database. For example, as of January 2014, this database contained information on 23 incidents involving ammonium nitrate dating back to 1986. EU researchers use this information to develop semi-annual publications in order to facilitate the exchange of lessons learned from accidents for both industry and government regulators. Each publication focuses on a particular theme such as a specific substance, industry, or practice, and summarizes the causes of related accidents and lessons learned to help prevent future accidents. EU officials told us that the next publication will be issued in the summer of 2014 and will focus on the hazards of ammonium nitrate in part as a result of the explosion that occurred in West, Texas.

Routine Inspections. In the EU, member countries are required to inspect facilities with large quantities of chemicals covered by the Seveso Directive, which includes facilities with ammonium nitrate.[77] According to EU officials and documents, the EU's Seveso Directive requires covered facilities to be inspected either annually or once every 3 years, depending on the amount of hazardous chemicals a facility has—the greater the amount, the more frequent the inspection. EU officials also explained that member countries are required to report information to the European Commission every 3 years on how they are implementing the Seveso Directive requirements, including the number of facilities that have been inspected in their country.[78] According to a report published by the European Commission in June 2013,

[77] OECD's *Guiding Principles for Chemical Accident Prevention, Preparedness and Response* directs public authorities to ensure safety requirements are met through appropriate inspection and enforcement measures, such as periodically inspecting safety performance in hazardous facilities.

[78] Under the new Seveso III Directive, member countries are required to report information to the European Commission every 4 years.

member countries reported in December 2011 that they had 10,314 covered facilities. According to the report, of those facilities to be inspected annually, 66 percent were inspected, on average, in 2011, and of those facilities to be inspected once every 3 years, 43 percent were inspected, on average, in 2011.[79]

Voluntary Initiatives and Third Party Audits. In the countries we reviewed, the fertilizer industry has actively promoted voluntary compliance with national safety requirements among facilities with ammonium nitrate fertilizer. For example, Fertilizers Europe, which represents the major fertilizer manufacturers in Europe, published guidance in 2007 for the storage and handling of ammonium nitrate based fertilizers. This guidance recommends that buildings used to store ammonium nitrate based fertilizers be constructed of non-readily combustible materials such as brick, concrete, or steel and that wood or other combustible materials be avoided, among other things.[80] Fertilizers Europe has also developed a compliance program that is a key requirement for membership, which consists of independent third party audits. As part of the program, it developed a self assessment tool for fertilizer manufacturers to use to identify gaps and possible improvements.

In the United Kingdom, the government and the fertilizer industry worked together in 2006 to develop a voluntary compliance program for facilities that manufacture and store fertilizers, among other activities, including ammonium nitrate based fertilizers. [81] According to a United Kingdom official, the government provided some of the initial funding for this initiative, and the voluntary compliance program is now self financed. Although the program was initially focused on fertilizer security, it has evolved over the years to also address fertilizer safety in the United Kingdom. As part of the voluntary compliance program, participating facilities carry out risk assessments. These facilities are audited annually by an independent audit team comprised of specialists to determine whether they comply with industry and government standards, including

[79] These facilities are not just facilities with ammonium nitrate, but include facilities with more than threshold amounts of all of the chemicals covered by Seveso. For more information see *Report on the Application in the Member States of Directive 96/82/EC on the control of major-accident hazards involving dangerous substances for the period 2009-2011* (Brussels, 6/28/13).

[80] *Guidance for the Storage, Handling and Transportation of Solid Mineral Fertilizers*, European Fertilizer Manufacturers' Association (April 2007).

[81] The voluntary compliance program in the United Kingdom is known as the Fertilizer Industry Assurance Scheme.

standards for safely storing and handling ammonium nitrate fertilizer. Officials we interviewed in the United Kingdom told us that the government encourages and supports this industry initiative and that about 90 percent of facilities with ammonium nitrate in the United Kingdom, including those that have small quantities, are members of the voluntary program.[82] A United Kingdom official said, in his opinion, one would expect facilities participating in this industry initiative to be more likely to be found in compliance by the government when it conducts its own inspections. Furthermore, government officials, industry representatives, and program administrators meet twice a year to discuss how the program is being implemented and monitored.

Conclusions

Large quantities of ammonium nitrate are present in the United States, although the precise number of facilities with ammonium nitrate is not known. While incidents involving ammonium nitrate are rare, this chemical has the potential to react in ways that harm significant numbers of people and devastate communities. Facilities are required to report their chemical holdings to federal, state, and local authorities for security and emergency planning purposes. However, given the various reporting requirements and numerous reporting exemptions, some facilities may be uncertain about what to report to whom. Through the new Executive Order, federal agencies including DHS, EPA, and OSHA have the opportunity to work together on data sharing initiatives to help identify facilities with ammonium nitrate fertilizer. Such data sharing could help federal agencies identify facilities that are not complying with their regulations and enable OSHA to target high risk facilities with ammonium nitrate for inspection. Without improved coordination among the various federal and state agencies that collect data on facilities that store potentially hazardous chemicals, identifying facilities with ammonium nitrate for purposes of increasing awareness of the hazards and improving regulatory compliance will remain a challenge.

Although OSHA has requirements for storing ammonium nitrate fertilizer in its Explosives and Blasting Agents regulations that could reduce the likelihood of an explosion, OSHA has done little to ensure that the fertilizer industry, which is one of the primary users of ammonium nitrate, understands how to comply with its existing regulations. The August 2013 chemical advisory and OSHA's February 2014 letter to facilities help clarify how OSHA's Explosives and Blasting Agents regulations apply to fertilizer facilities. However, without additional action by OSHA to

[82] The voluntary program in the United Kingdom does not apply to end users, such as farms.

promote awareness of how to comply with its regulations, fertilizer facilities may not know how to make the changes necessary to comply with OSHA's existing ammonium nitrate storage regulations. Moreover, unless OSHA takes steps to leverage additional resources to support its enforcement efforts, whether through enhanced targeting or coordination with other agencies or outside parties, beginning with encouraging voluntary compliance with ammonium nitrate regulations through various industry initiatives, it will not know the extent to which dangerous conditions at some facilities may continue to exist.

While much can be achieved under current regulations, OSHA and EPA's regulations contain gaps with respect to ammonium nitrate that may allow unsafe facilities to operate and poor planning to persist. OSHA has not significantly changed its ammonium nitrate storage regulations since they were issued in 1971, which means that fertilizer facilities may be adhering to outdated practices. For example, other countries we reviewed have revisited and updated their ammonium nitrate regulations and the National Fire Protection Association is considering making changes to its ammonium nitrate storage standards as a result of the explosion in West, Texas. In addition, as a result of incidents involving ammonium nitrate abroad, countries in the European Union and Canada require facilities to assess the risks of working with ammonium nitrate fertilizer, and the European Union requires member countries to routinely inspect facilities that have very large quantities of it. These approaches offer examples of how the risks of ammonium nitrate can be managed. Although increased regulation may be more burdensome to industry, without some means of ensuring that high risk facilities plan for and manage the risks associated with ammonium nitrate, such facilities may not be prompted to adequately address the risks the chemical creates for workers and neighboring communities.

Recommendations for Executive Action

1. To improve federal oversight of facilities with ammonium nitrate, we recommend that the Secretary of Labor, the Administrator of EPA, and the Secretary of Homeland Security, as part of their efforts as members of the Chemical Facility Safety and Security Working Group established by the Executive Order issued in August 2013, develop and implement methods of improving data sharing among federal agencies and with states.

2. We also recommend that the Secretary of Labor direct the Assistant Secretary for Occupational Safety and Health to take the following three actions:

- Extend OSHA's outreach to the fertilizer industry. For example, OSHA could work with the fertilizer industry to develop and disseminate informational materials related to storage of ammonium nitrate.

- Take steps to identify high risk facilities working with ammonium nitrate and develop options to target them for inspection.

- Update and expand regulations for ammonium nitrate to be consistent with other related standards and current practices.

3. To strengthen federal oversight of facilities with ammonium nitrate, we recommend that the Secretary of Labor and the Administrator of EPA direct OSHA and EPA to consider revising their related regulations to cover ammonium nitrate and jointly develop a plan to require high risk facilities with ammonium nitrate to assess the risks and implement safeguards to prevent accidents involving this chemical.

Agency Comments and Our Evaluation

We provided the Administrator of EPA, the Secretary of Homeland Security, and the Secretary of Labor a draft of this report to for review and comment. We received written comments from EPA, DHS, and OSHA, which are reproduced in their entirety in appendices I, II, and III.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the appropriate congressional committees, the Secretary of Labor, and other interested parties. In addition, the report will be available at no charge on the GAO website at http://www.gao.gov.

If you or your staffs have any questions concerning this report, please contact me at (202) 512-7215 or moranr@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix IV.

Revae Moran, Director

Education, Workforce, and Income Security Issues

Appendix I: Comments from the Environmental Protection Agency

Appendix II: Comments from the Department of Homeland Security

Appendix III: Comments from the Department of Labor

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact: Revae Moran, Director, (202) 512-7215 or moranr@gao.gov

Staff Acknowledgments: In addition to the contact named above, Betty Ward-Zukerman, Assistant Director; Theodore Alexander, Nancy Cosentino, Joel Marus, Meredith Moore, and Catherine Roark made significant contributions to all phases of the work. Also contributing to this report were Hiwotte Amare, Jason Bair, James Bennett, Susan Bernstein, Stephen Caldwell, Sarah Cornetto, Charles Johnson, Jr., Kathy Leslie, Ashley McCall, Sheila McCoy, Jean McSween, John Mortin, Vincent Price, Stephen Sanford, Sushil Sharma, Linda Siegel, Maria Stattel, and Kathleen van Gelder.

(131261)